

An Paper March 16th 1827
W. G. H.

Inaugural dissertation

On

Hydrocephalus Internus

by

Morris Lancaster

of

Bucks County

Pennsylvania

to passing
top of ancient
that the under
their operations
for acquaintance
was subjected
of the process
of the nature
phenomena
had lain as
march of time
it became new
of discovery - a
that a more
time of their
cultivators of
experience - so
in ombra. as
advantages

In pointing from the intuitive genius or unvaried industry of ancient philosophers we find at an early period that the rudiments of many sciences were discovered and their functions explained. This knowledge was the result of an acquaintance with those phenomena of nature which were subjected to the immediate observation and pot-
 of the senses: But as science advanced to an explanation of the nature of the causes by whose operations these phenomena were produced— and as new regions which had lain as in the womb of chaos from the first march of time, were explored by the genius of investigation it became necessary in order to support the progress of discovery— and to sustain the advances of knowledge that a more intimate acquaintance with the productions of their producers should be sought for by the cultivators of science; for had each relied on his own experience— science would for ever have remained in embryo and mankind been denied the immense advantages which have resulted from this combination.

of the sphere
with the know
age have trans
most ingenious
brag life too
ious relative p
cases of phren
to their people
an advance en
that the medic
study, a slave
incubation - p
purpose of pove
have passed the
philosophers - a
poisonous shafts of
influenced by the
from the ardour
imposed on every

of the experience of ages. For without an acquaintance with the knowledge which the learned of former ages have transmitted to posterity, the exertions of the most ingenious mind would be but dexterity, and the longest life too short to arrive at any satisfactory conclusions relative to the mysterious operations of the occult causes of phenomena in nature.

If then such extensive acquirements are necessary to warrant an advance on settled ground how can it be expected that the medical student - from the perusal of his study, a slave to authority or the victim of delusive speculation - should attempt to investigate for the purpose of novelty, those unexplored regions which have baffled the genius of the most experienced of medical philosophers - and hope to shield his imperfect ^{speculation} from the piercing shafts of criticism, or save it from disgrace. Influenced by these considerations I should have shrunk from the arduous task: But impelled by an imperative injunction on every student of medicine I have in

Andence is its origin
a disease which
of its investigation and
victims with which
not pretending to
honour of having
was unknown—

obedience to its injunctions composed this short essay on
a disease which derives importance from the difficulty
of its investigation as well as from the innumerable
victims with which it has peopled the grave, with-
out pretending to the merit of originality, or to the
honour of having added to it ought that previously
was unknown.

In the last of
human system
for its later form
Ectocarpales
Schall state a
insidious form of
children from
ad. Rather, please
severely from cl
the year but in
tion of the, veru
hinder, robust, and
and with testimony
B. The period of
times for three
sometimes 1/2 to 1
and in others the
in even years in
arhales, internus

In the list of the innumerable maladies to which the human system is subjected, none stands more prominent for its fatal termination than the subject of this description, viz Hydrocephalus internus. and previous to giving its history I shall state a few preliminaries. 1st. This dangerous and insidious form of fever is with a few exceptions peculiar to children from the early age of six months to that of twelve years. 2nd. Neither situation, climate, nor condition of life can afford security from its attack. 3rd. It occurs at all seasons of the year: but more frequently during the variable temperature of the vernal months. 4th. Children having large heads, robust constitution - full habits especially those attended with asthenia are most subject to attack of this disease. 5th. The period of its duration is variable - it generally continues for three weeks. though in very young children it sometimes ~~less~~ terminates fatally in four or five days and in others the exacer has continued for weeks, months or even years in the ventricles of the brain. History of Hydrocephalus internus. The patient is at first languid, heavy

and possibly being
made, though at the
time at this early
Hour to the heart
agitated themselves
and forgiveness of
The spiritless seem
raised with reason
and the heart
is a tender and
suspense in days
he passed towards
longer much fur
ward the patient
want heart-ache pain
in the crown of the
which case when
the pain of the heart
is generally attended

and perish losing its accustomed relish for playful amuse-
ments, though at times cheerful and apparently free from complaint.
Even at this early period of the disease an undue determination
of blood to the head is unequivocally pointed out, by small but
repeated hemorrhages from the nose, an unusual throbbing
and pulsance of the temporal arteries, noise in the ears, &c.
The appetite become impaired—frequent but transient fits of
nausea with occasional vomiting ensue, the urine is high colour-
ed, and the bowels are generally costive. At this period there
is a tenderness of the cranium rather than pain, with
restlessness in sleeping. In a little while the face is observed to
be flushed towards evening, the skin hot and dry, and the
tongue much furrowed. Soon after these symptoms have ap-
peared the patient becomes affected with a sharp and con-
stant head-ache seated in the forehead, or if not there generally
in the crown of the head though sometimes at the side in
which case when erect, the head inclines to the affected side.
The pain of the head and the affections of the stomach
frequently alternate the one being relieved by the

given advice
 from the head
 as to the extent
 of the back of
 induces desired
 good character
 suffer with
 return alarm
 in their effects—
 far attended
 low and irregular
 of the voluntary
 light, sound, &c
 that their im-
 blance often a
 runs, with y
 though in other
 and intelligent
 this period, the
 rate, while the
 asked to it, the
 this is from a

excessive action of the other. Frequent metastases of virus from the head to other parts of the system often ensue - as to the extremities or to the bowels but more constantly to the back of the neck - or between the poplitea. This insidious disease at length assumes an open and confirmed character invading the system of the unhappy sufferer with a train of symptoms formidable in their nature - alarming in their appearance - and destructive in their effects - The patient is arrested with a violent fever attended with a full, tense, quick though sometimes slow and irregular pulse followed by a great prostration of the voluntary powers. So great is the sensibility to light, sound, or motion at this period of the disease that their impressions are almost insupportable - it is likewise often accompanied especially in children of four years, with symptoms of high and furious delirium though in other cases the patient remains sensible and intelligent untill the stupor supervenes - during this period the constipation of the bowels remains obstinate - while the stomach is very little affected whatever is applied to it - the sleep is broken and interrupted - the child starts as if from a frightful dream screaming as though

bright, quite
 than the down
 we saw subject
 & unresistible
 & generally feel
 ple a little m
 we have thin
 than usual -
 the heat ash
 After the discov
 or fifteen days
 pines as the co
 mica seems slo
 symptoms ment
 the head or u
 able from the
 number, which
 disease, is now
 the farther the
 don't increase
 we half closed
 sight the p

77
tensed - grinds his teeth - picks his nose

When the above mentioned symptoms have continued for a few days subject as they always are to a great fluctuation. A remarkable change is discerned in the eyes. the axis of one is generally found turned inwards and the pupil on this side a little more dilated than on the other - when both eyes have their axis directed inwards they are more dilated than usual - the vomiting becomes more constant and the head-ache more excruciating.

After the disease has continued in this manner for ten or fifteen days it undergoes that change pointed out by writers as the commencement of the second stage. The pulse becomes slow and unequal - and though most of the symptoms mentioned in the first stage continue, the pain of the head or whatever part previously affected seems to abate from the decreased sensibility. The interrupted slumbers, which prevailed during the earlier part of the disease, is now succeeded sometimes by an almost lethargic torpor - the strabismus and dilatation of the pupil increase - the patient lies with one or both eyes half closed which are often found insensible to light - the vomiting

any, food or
the bowels and
disease still a
last stage
becomes rapid
the pulse or ac-
the urine
anxious -
sitting or is
great - and ge-
it ends to the
the thin stage
the pulse and
great and the
becomes slow, or
becomes rapid
tion
But if may,
will depend, the
the disease can
Not mortu-
parts of the brain

cases, food or medicine is swallowed with apparent voracity, the bowels remaining generally obstinately constive. If the disease still continues progressing, the symptoms of the last stage soon succumb to those mentioned - the pulse becomes rapid, ~~depressed~~^{tact}, and chorded, the brain contracted, skin pale or ash colored - the eye squint-brown is at last lost - the urine is either retained or with the feces discharged involuntarily - violent distortion of countenance ensues - sudden twitching or involuntary contraction of the muscles become frequent - and general convulsions arising on put a period at once to his existence.

The three stages of the disease are characterised by the state of the pulse and of the sensibility. In the first the pulse is frequent and the sensibility great. In the second the pulse becomes slow, with marks of oppressed brain. In the third it becomes rapid, there being great debility and ~~exhaustion~~^{pal} irritation.

But it may be remarked that these stages are not sharply well defined, the pulse sometimes never becoming slow, & that the division cannot be relied on.

Post mortem examination, shows a purpescence of the parts of the brain - a partial inflammation of its membranes

covered with
of the hair, a
small number
of cells and
however occur
it is to be found
well as the
Epithelium
after the dis-
sident course
sometimes loss
This is often a
fine diffusion he
stage of the d
declines to an
hence the m
a state of hi
quant. fluid.
from
conditions are
after a short
acts as a rec

6
covered with coagulable lumps - effusion in the ventricles
of the brain, of serum or water coagulable or otherwise - the
dural membrane or its covering sometimes participates in the
affection and water is ~~often~~ found there. Epises
however occur where in the brain no trace of the disease
is to be found - the stomach is often found inflamed as
well as the hepatic apparatus.

Expunction of some of the phenomena of the disease
after the disease has continued for ten or fifteen days, in
violent cases a cessation of most of the formidable ^{traces} symptoms
sometimes takes place promising a speedy recovery.
This is often a most treacherous and fatal calm, resulting
from effusion having taken place into the ventricles. The first
stage of the disease is that of increased irritability produces
frequently by an inflamed and distended state of the blood-vessels
- hence the many symptoms in that stage which bespeak
a state of high excitement - as the full, tense, and fre-
quent pulse, violent head ache &c. When therefore
effusion from the highly excited vessels takes place these
symptoms are relieved - and the attack suspended.
After a short interval however the extraneous fluid
acts as a revivifying cause and the disease returns

with peduncle
state of the eye
condition. which
palant
Stabismus
very considera
impulsion in to
the impulsion
contraction of
is kept in the
is that the ac
preparation to the
retina to its
nervous of the str
vulgarum per
judiciable - an
The Diagonal
is its power
is distinguished by
character. By
by authors in the
no words on

with redoubled force, is the primary cause of the distended state of the blood-vessels—continuing to act, reproduces that condition, which with the effusion quickly sinks the patient.

Strabismus seldom if ever takes place till after the existence of very considerable fever, and is the result of effusion or congestion in the volume of the enophthalon—produced by the impulsive violence of febrile action.

Contraction of the pupil is produced by the impression of light on the retina extended by sympathy to the iris, so that the dilatation of the pupil will be in inverse proportion to the stimulus of light or the sensibility of the retina to its impressions. The effusion pressing on the origin of the optic nerve, in the thalami nervorum tractuum pendens, the retina in a great measure insensible—causing the phenomena of strabismus and dilatation.

The Diagnosis, such is the aspect which this disease in its progress often assumes that it is extremely difficult to distinguish it from some other affections of a similar character. But as a diagnosis has usually been given by authors in treating of this complaint I shall speak a few words on this subject.

fits a slow
originating
Butler of
the intestinal
sticking isent
broader which
and sticking
six - and in
In disorders
causes - slow
- often take
difficult - but
symptoms which
hydrocephalus
are by heating
may a death
to be employed
Burns says
lower with a
the patient
especially as
the with gener

With a slow irregular intermittent termed verminosa febris
originating often times from the irritation of worms—and
as Butler asserts likewise from crude accumulations in
the intestinal canal hydrocephalus internus holds a
striking resemblance. Five symptoms of verminosa febris
however which most commonly attend are peculiar
and striking—these are a very strange alteration of
voice—and in some instances a total loss of sight.
In disorders of the bowels arising from dentition or other
causes—nausea—startings—tremors—and strabismus
—often take place which renders a distinction very
difficult—but where many of the most prominent
symptoms which I have mentioned as constituting
hydrocephalus make their appearance we shall seldom
err by treating it as hydrocephalus—for though it still
may be doubtful yet the remedies which here are proper
to be employed will apply to other similar affections.
Bueno says it is prudent whenever there is much
fever with any ambiguous symptoms to proceed as if
the patient was threatened with hydrocephalus more
especially as the early use of the remedies thus indica-
ted will generally be serviceable in these complaints.

with which the
of the progre
series of any
spring of unct
a greater than
from great vict
tation of the pe
takes place. per
it generally ter
hydrocephalus
symptoms.
Excess of the
a position. The
the child's head
fetal periment
the great disten
the rest of the b
act as a predis
disinfect, and
and must unde
it and to the
place - and the

with which this disease may be confounded.
of the prognosis. When the disease arises from the sup-
pression of any accustomed evacuation - or if it is the
disorder of another disease, the prospect of recovery will
be greater than when it arises from schirous glands or
from great violence done to the head. When the disor-
der of the pupil increases - a strabismus - or ~~de-~~^{de-}pression
takes place, subultus tendinum or convulsions happen
it generally terminates fatally. But recoveries from
hydrocephalus do occasionally follow the most desperate
symptoms.

Causes of the disease. There are either predisposing
or exciting. The very unfinished and imperfect state of
the child's head, at the time it emerges from its
fetal position into the enjoyment of actual life - and
the great disproportion that exists between it and
the rest of the body at this period must evidently
act as a predisposing cause. Not to suppose that
deficiency, and meet the chances which the infant's
head must undergo a greater determination of blood to
it and to the adjacent parts must necessarily take
place - and that this determination of blood to the head

usually does
patience and me
to be alarmed
head of, infor
ally of, for
with a dis
discharge of
blood to the
to all of the
those arising
vessels of the
acting on to
produce no
either thro
hair. The
flow, or be
gions of the n
The indirect
from the syng
complaints, ca
and syphous
impure pers.

actually does exist, the constant and profuse discharge of
saliva and mucus from their eyes, nose, and mouth, and also
the troublesome eruptions which frequently appear on the
head of infants sufficiently prove. And when an
attack of fever occurs in these tender subjects - attended
with a dry skin - costiveness - and a poisonous
discharge of urine - so much is the determination of
blood to the brain increased, as to subject the patient
to all of the ~~diseases~~^{serious} consequences of effusion or to
those arising from an undue and morbid action of the
vessels of the part. The exciting causes - which by
acting on the above-mentioned condition of the brain
produce hydrocephalus - are numerous. They are
either those which act directly or indirectly on the
brain. The causes which act directly are falls,
blows, or bruises on the head, exposure to cold - pas-
sions of the mind &c

The indirect causes are irritation from the prima via, or
from the hepatic viscera, worms, scrods, autumnal fevers, bowel
complaints, catarrhal fever, intermittent, remittent, continued
and typhoid fevers, rheumatism, pulmonary consumption,
ruptive fever, cholera, palsy, metachely, dysentery, dentition

[Faint, mostly illegible handwriting on the left page, possibly bleed-through from the reverse side.]

Notes

insulation, so
The former of the
action of the a
through 5 place
prohibitory action
did, that, in
a disorderly
is. To this co
association re
various consider
log of the disea
The encephalic
of intro-actio
by provocations
down - the
stomach and
quid - the
hibition of
exhibited on
no slight de
and official
none at all

117
injection, periphula, and the sudden healing of old sores.
The former of those causes appears most generally to be the
author of the disease. Perhaps Professor Chapman
though I place the proximate cause of hydrocephalus in a
morbid action of the brain. I am not the less persua-
ded, that, in a large majority of cases, it commences in
a disordered state of the stomach or some of its dependen-
cies. To this conclusion I am conducted, by the well-known
association which exists in this system of parts, and by
various considerations which may be deduced from the his-
tory of the disease, such as the great disorder observed in
the chylificative viscera, sometimes for weeks before the appearance
of hydrocephalic symptoms—the removal of these symptoms
by purgatives, and other remedies directed to the alimentary
canal—the extreme tenderness felt in the regions of the
stomach and liver—the obstinate constipation at this
period—the peculiarity in the stools, indicating extreme
irritation of the biliary secretion, and the phenomena
exhibited on dissection, proving the previous existence of
no slight disease in most of the abdominal contents,
and especially in the stomach and liver, and sometimes
none at all in the brain.

Proximate
hydrophalous
Quercus avar
mations. L.

and opposite
in connection.

source a pour
a correct p.

Address, by
which at a

clined to bla
Wethering s

sligelt - prof.

T. Rush

only as the

congestion of
in that the

which produces

degree of that

18

Proximate cause. What is the state occasioning hydrocephalus internus is it inflammation, and is the effusion analogous to that succeeding to other inflammations. On this point writers for a long time disagreed and opposite opinions are still entertained by them which in conjunction with the equivocal nature of its symptoms prove a source of considerable embarrassment to forming a correct pathology of the disease.

Bridges, believed it to belong to inflammation for which at an early period he says he should be inclined to bleed as freely as in pneumonia.

Withering says, that in many if not all congestion or slight inflammation are the precursors to the aqueous accumulations.

D^r Rush thought that instead of its being considered an idiopathic dropsy - it should be considered only as the effect of a primary inflammation or congestion of blood in the brain. It appears says he that the disease in its first state is the effect of a cause which produces a low degree of local inflammation, which constitutes phrenitis, and that its second stage is a high degree of that effusion which produces serious and often

[Faint, mostly illegible handwriting on the left page, likely bleed-through from the reverse side.]

in the adult
of Larva in
part of the
Wright's
is the same - the
as marks the
find than
that dropsy, &
the arterial
it is that the
tion to that of
dropsy, follows
is to be found in
functions of the
tion, such dis
often known
cause of hydroc
action of the pass
of the disease cla
in acute and
in suppuration,
also of febricitis

in the adult

Dr. Garzin supposes inactivity or torpor of the absorbent vessels of the brain to be the cause of hydrocephalus internus. Whittle observes that the immediate cause of every dropsey is the same - that is such a debilitated state of the vessels as makes the exhalent arteries throw out a greater quantity of fluid than the absorbents can take up.

That dropsey ever arises from a debilitated condition of the arterial system, to me appears very doubtful - certain it is that the activity of the absorbent is in inverse proportion to that of the sanguinous system - and whenever dropsey follows a reduced state, the immediate cause is to be found in a disorganisation of the structure or functions of the part - in the production of which condition, such diseases as usually precede it, are often known to prevail: That the immediate cause of hydrocephalus is to be found in an increased action of the vessels of the brain, the various symptoms of the disease clearly show.

An acute and considerable degree of inflammation ends in suppuration, and this is the termination of many cases of phrenitis - a more moderate degree capable of

quater prole
a plate of
this and
consequence
and altered
an effusion
organic str
its morbid
This attend
its modifica
from the p
equalled - from
vian at p
or from a
hydroceph
as primary
presence of
an enormous
disease, but
often still
of the dise
in primaries

quater prolongation - ends in serous apoplexy, - ~~even~~ ^{even} a state of action inferior to inflammation produces this, and this is the state which I consider as the commencement of hydrocephalus internus. An increased and altered action of the vessels of the brain, causing an effusion into the ventricles or a derangement of the organic structure of the brain by the operation of its morbid impressions on it.

This altered action of the vessels is one sui generis receiving its modification from the tissue in which it is seated - from the nature of the causes by whose impressions it is excited - from the state of the system or condition of the brain at the time of the operation of those causes or from a combination of them all.

Hydrocephalus internus considered by many authors as primarily a distension of the brain arising from the presence of water in the ventricles, is in this respect an erroneous term. For effusion is not the cause of the disease, but the results of the operation of the diseased action itself, nor is it a necessary consequence of the diseased action, ^{but the want of its appearance in numerous dissections sufficiently proves}

And yet
invariably
for they are
from the
absorbents
Heartment
attain, and
the most p
be employed
is to preserve
statement
spectral pe
Resolves a p
quires com
a picture - so
nature - the
which is p
the most fl
be notorious
If such had
of this name
of the color

157
And whenever it does result in effusion it is almost inevitably fatal not from the want of absorbents for they certainly exist as the brain itself - but from the insufficiency of our means to arouse those absorbents into action.

Treatment of hyperaesthesia. From the vehemence of the attack, and the impetuous progress of the disease, remedies the most prompt and decisive in their operations should be employed. The first and leading indication of cure is to prevent effusion by subduing that state of excitement which prevails to produce it. The most effectual remedy to produce which, is blood-letting. Aesculapio a name that will be remembered as long as genius commands respect - or philanthropy steered as a pilot - considering it similar to phlebotomy in its nature - he employed blood-letting to the same extent which is usual in that disease - and he says with the most flattering results, out of twelve cases treated by copious bleeding seven were restored to health. If such had been the general results of the employment of this remedy, it would not have been unworthy of the eulogium bestowed upon it, by the American

Spokenham will be the
time and to
plated by
attain - and
General be
- as the a
Maid. The
Fragrance
have much
own to re
they are ce
to down the
the top of
accumulation
pitiated sec
be employed
Directors. In
we have the
writers, ju
utility. In
appears the

16
Splenham. The farther it is employed the more beneficial
will be the duration - the quantity, to be drawn at each
time and the frequency of the bleeding, should be reg-
ulated by the age of the patient - the violence of the
attack - and the consequence of former bleeding.

General bleeding is much assisted by local depletion
- as the application of cups and leeches to the
head. Which should never be omitted.

Purgatives are a class of remedies in which practitioners
have much ruled. By some purging is supposed superior
even to venesection - employed only in the complaint
they are certainly very beneficial, and are called for
to divert the blood from the head, as well as to procure
the torpid condition of the bowels - to remove the foul
accumulation which they contain, and to settle the
irritated secretions of the liver. Calomel should
be employed and so as to produce active purgation.
Physics. In support of the propriety of their employment
we have the concurring testimony of most practical
writers, supported by the clearest evidence of their
utility. In respect to their modes of operation, it
appears that their remedial effect is not confined to

that produce
demonstrated
action can
put me in
that in me
on a part-
ting action
hence the
of plasters.
stimulus ^{acting}
be blood-letting
should be the
application.
twenty four
when subse-
some thing a
arises
Emetics are
from an irrita-
probably from
cerebral affec-
tionary process

17
that produced by the evacuation. For it has been
demonstrated to a certainty that an existing morbid
action can be removed by creating a new and dif-
ferent one in the same part - nor is it less certain
that in many instances, a powerful impression made
on a part - produces a removal of a morbid exis-
ting action in some remote part of the system
hence the benefit which often follows the application
of blisters. But to avoid in a measure their
stimulating property - blisters should be preceded
by blood-letting, both general and topical. The hair
should be shaven from the head previous to their
application, and they continued on for at least
twenty four hours. They are more decidedly useful
when supuration of the scalp is induced, by
some they are likewise applied to the wrists and
ankles

Emetics are very useful when the disease arises
from an irritated or oppressed stomach. they act
probably here on the same principle as in other
cerebral affections

Acrony was for a long time considered by practitioners

[Faint, mostly illegible handwriting on the left page, possibly bleed-through from the reverse side. Some words like "water" and "form" are faintly visible.]

as the only
disse, after
water have
genic form
then filae
It should
As much as
will bear
palle, this
desperate c
This with
phlogistic
room dar
just - just
sequences of

18
as the only remedy, capable of contending with the
disease after its confirmation - and though many later
writers have undervalued its virtues - yet in the
chronic form of the disease, or after effusion has oc-
-curred - it appears to be our only ^{resource} ~~resource~~.
It should be applied in the boldest manner
- as much calomel given internally as the stomach
will bear, and the blue ointment applied exter-
nally. Treated in this manner some of the most
desperate cases have yielded to its power.
This with a strict attention to the whole anti-
phlogistic plan of treatment - Keeping the
room darkened where great sensibility to light
exist - rest - and silence - constitute the chief
resources of our art against this disease.

Dr Bone

7









